

## **REMARKS**

### **I. The Pending Claims and the Amendments to the Claims**

In the amendment to the claims above, the only amendment is the cancellation of Claims 1-5. More particularly, with the entry of the amendments above, the pending claims are Claims 6, 8, 10-14, and 16-22, with Claims 6, 16, and 19 being the pending independent claims, and Claims 8, 10-14, 17, 18, and 20-22 being the pending dependent claims.

Claim 6 is amended by the addition of the feature that the substrate comprises foam, i.e., the feature recited in Claim 7 has been incorporated into Claim 6, and Claim 7 has been canceled. Support for the amendment to Claim 6 can be found in the specification at, for example, Page 5 lines 1-14.

Claims 1-5 and 7 are canceled in order to simplify the issues and arguments for the remaining claims; the cancellation of Claims 1-5 and 7 is without prejudice or disclaimer. With the cancellation of Claims 1-5 and 7, no pending claims are directed to a film. Rather, Claims 6-8 and 10-14 are directed to a substrate/film composite in which the substrate comprises foam, and Claims 16-22 are directed to a tray comprising a substrate/film composite comprising a foam substrate. Thus, with the entry of the amendments above, all pending claims recite a substrate/film composite with the substrate comprising foam. The amendments include no new matter.

### **I. The 35 USC §103 Rejection and Applicants' General Response Thereto**

In Section 5 of the 25 July Office Action, Claims 1-8, 10-14, and 16-22 are rejected under 35 USC 103(a) as unpatentable over WIRTH (US5171640) in view of BEUZELIN et al (GB

2288177) and GUSAVAGE et al (EP 0 707 955). As a condensed summary, Applicants view the 19 October Office Action as drawing conclusions of unpatentability based on the following reliance on the applied references:

WIRTH is relied upon for teaching multilayer materials having an EVOH layer (a) and an outer bonding layer (b) comprising styrene-based polymer, with the multilayer material having a b/a/c structure; with the maleic anhydride-modified styrene-based polymer including embodiments in which the anhydride-modified styrene-based polymer includes 69% to 79% of the total material; with the styrene-based polymer being present in the outer bonding layer in a ratio of at least 0.1:1 with respect to the weight of the EVOH layer;

BEUZELIN is relied upon for modified styrene-based polymer having polar groups thereon in a food/tray container for the purpose of providing improved adhesive strength and resistance to layer separation;

GUSAVAGE et al is relied upon for the disclosure of multilayer materials having an overall thickness of from about 10 to 80 microns with a foam substrate in a food packaging material, for the purpose of reduced blistering and to lower production costs.

Moreover, the 25 July Office Action concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the multilayer materials of WIRTH by providing them with a multilayer material according to GUSAVAGE et al, i.e., a multilayer material having an overall thickness of 80-100 microns wherein the substrate comprises foam, in order to reduce blistering and lower production costs.

In response to the §103 rejection of the claims, Applicants contend that each of the pending Claims 6, 8, 10-14, and 16-22 is patentable over WIRTH in view of BEUZELIN and GUSAVAGE et al. First, Applicants contend that the 25 July Office Action fails to set forth a prima facie case of obviousness of pending Claims 6-8, 10-14, and 16-22. Second, Applicants

contend that to whatever extent the 25 July Office Action may have set forth a prima facie case of obviousness of any one or more of pending Claims 6, 8, 10-14, and 16-22, Applicants have rebutted the prima facie case of obviousness with a showing of objective evidence of nonobviousness.

## **II. A Prima Facie Case of Obviousness Has Not Been Established for Claims 6, 8, 10-14, and 16-22**

As an initial comment and admission, Applicants note that the 25 July Office Action states that “WIRTH does not disclose that the modified styrene based polymer has polar groups thereon.” Applicants disagree. Applicants note that WIRTH discloses styrene maleic anhydride copolymer, and that such a copolymer does in fact qualify as a “modified styrene copolymer having polar groups thereon”, as the carbonyl groups on the anhydride mer are of a polar nature. See Applicants’ specification at Page 7 lines 13-17. Thus, it is unnecessary to turn to BEUZELIN for the feature of a modified styrene copolymer having polar groups thereon, as such feature is already disclosed in WIRTH. Nevertheless, Applicants response below continues to take BEUZELIN into account, even though Applicants view the statements regarding BEUZELIN in the 25 July Office Action to be unnecessary to support the §103 rejection.

As noted in responses to previous rejections, Applicants again direct attention to the fact that both WIRTH and BEUZELIN are directed to relatively thick articles, i.e., thicker than the multilayer film component of the substrate/film article recited in each of Applicants’ pending independent Claims 6, 16, and 19. Indeed, that difference in thickness appears to be the reason

that all of the §103(a) rejections set forth in the previous office action were expressly withdrawn in Section 2 of the 25 July Office Action.

In order to establish a prima facie case of obviousness, Applicants contend that there must be a valid reason to modify WIRTH with BEUZELIN and GUSAVAGE et al so that the resulting subject matter is within the scope of Applicants' pending claims. The 25 July Office Action states, in effect, that it would have been obvious to have thinned down the multilayer materials of WIRTH to an overall thickness of from about 10 to 80 microns in order to:

...provide reduced blistering and lower cost of production by reducing the amount of materials consumed as taught by Gusavage. [25 July Office Action, Page 4, lines 16-18, emphasis added]

Applicants contend that one of skill in the art would not have been motivated to reduce the thickness of the multilayer structure in WIRTH in order to reduce the blistering. The 25 July Office Action does not point out any disclosure in GUSAVAGE et al indicating that reduced thickness is related to blister prevention. In reality, it appears that to reduce blistering, one of ordinary skill in the art would have been motivated to incorporate into the multilayer material of WIRTH the styrene-butadiene copolymer and/or styrene-acrylonitrile copolymer of GUSAVAGE et al, rather than thin down the multilayer structure.

Applicants further contend that "...reducing the amount of materials consumed as taught in Gusavage" also would not have motivated one of ordinary skill to have reduced the thickness of the multilayer structure in WIRTH. WIRTH teaches a multilayer material having an overall thickness of from 140 microns to 4.5 millimeters. See WIRTH Col. 2 lines 11-42. A multilayer structure having a thickness of from 140 microns to 4.5 millimeters is a relatively thick, relatively stiff structure, particularly when used to make "...packing materials or vessels (e.g.,

drinking glasses)....” See WIRTH Col. 1 lines 11-12. The 140 microns to 4.5 millimeter thickness of the multilayer structure of WIRTH is relatively very thick and stiff compared with the 10 to 80 mil thick multilayer film Applicants’ Claims 6, 16, and 19; i.e., a minimum of 75% thicker than the maximum thickness recited in Applicants Claims 6, 16, and 19. Because stiffness increases in proportion to thickness squared, WIRTH teaches a stiffness of, at a minimum, over 3 times the stiffness of the multilayer film of GUSAVAGE et al, assuming all other factors are the same. As a result, it would not be obvious to thin such a structure down to 10 to 80 mils, as recited in Applicants’ claims. Depending on the degree of stiffness present, such an article would either be so floppy that it would not be satisfactory for use as a packing material or vessel, or would be so fragile that it would be too weak for such an end use. Thus, thinning down the multilayer material of WIRTH so that it has a total thickness of 10-80 mils would defeat the purpose of WIRTH. As such, it is apparent that the Office Action modifies WIRTH in a manner that defeats the purpose of WIRTH. Accordingly, a prima facie case of obviousness of Claims 6, 8, 10-14, and 16-22 has not been established in the 25 July Office Action.

### **III. Applicants’ Specification Contains Objective Evidence of Nonobviousness: Unexpected Results**

As amended above, pending independent Claim 6 recites:

A substrate/film composite comprising a substrate and a multilayer film comprising an outer heat-sealable polyolefin layer, a core gas-barrier layer ...and wherein the substrate comprises foam.

Also, pending independent Claim 16 recites:

... a substrate/film composite comprising a foam substrate and a liner comprising a multilayer film having...a core gas-barrier layer....

As is apparent from a review of these portions of pending independent Claims 6 and 16, each of the two remaining independent claims recites a substrate/film composite in which the substrate comprises foam and the film is a multilayer film having a gas barrier layer.

Applicants' specification states that the presence of the modified styrene-based resin in the multilayer barrier film has (a) resulted in allowing the polystyrene substrate to contain up to 100% reclaim of the composite material, and (b) resulted in avoiding the formation of blisters between the foam and the film:

It has now been found that when a gas-barrier film is used which contains an amount of styrene-based polymer of at least 35 percent by weight, where at least part of said styrene-based polymer is in the form of a modified styrene-based resin, it is possible to manufacture a polystyrene/gas-barrier film composite with gas-barrier and heat-sealability properties comparable to the composites described in the literature and actually on the market, and where the polystyrene substrate may contain up to 100 percent of reclaim material of the composite itself. [Applicants' specification, Page 4 lines 17-23]

It has also been found that when gas-barrier liners are employed that, according to the present invention, contain an amount of styrene-based polymer of at least 35 percent by weight, where at least a part of said styrene-based polymer is in the form of a modified styrene-based resin, it is also possible to avoid any blistering effect throughout the overall structure, even with low thickness liners. [Applicants' specification, Page 4 lines 24-28]

Applicants contend that both (a) up to 100% recycle, and (b) prevention of blistering, are unexpected results. Applicants further contend that these unexpected results are commensurate with the scope of the claims, as amended above.

The 25 July Office Action states that GUSAVAGE et al discloses multilayer materials of 10-80 microns thickness in combination with a foam substrate for reduced blistering and with cost lowering by reducing amount of material used. [Page 4 of 25 July Office Action.] However, a review of GUSAVAGE et al reveals the disclosure of the use of a bonding layer between the film and foam in which the bonding layer contains styrene-butadiene or styrene-acrylonitrile copolymer.

Neither styrene-butadiene nor styrene-acrylonitrile is included in Applicants' detailed description of their recited "modified styrene-based polymer having polar groups thereon", i.e., as recited in independent Claims 6 and 16. More particularly, Applicants' specification discloses the modified styrene-based polymer as follows:

As used herein the term "modified styrene-based polymers", is intended to refer to those styrene-based polymers which are modified by the presence of a polar group that may be grafted onto the polymer backbone or co-polymerized therewith. Suitable polar groups are the unsaturated carboxylic acids (e.g., maleic acid, fumaric acid), and the functional derivatives thereof, such as the corresponding anhydrides, esters, or salts. [Applicants' Specification, Page 7 lines 13-17]

As is apparent from this portion of Applicants' specification, Applicants' recited "modified styrene-based polymer having polar groups thereon" could not have been predicted to have resulted in the advantages of either (a) up to 100% recycle or (b) blister prevention.

Applicants note that blister prevention appears to be governed by chemistry and appears to be unpredictable. Further evidence of the unpredictable nature of blister prevention is present in Table I of GUSAVAGE et al:

Table I

Ex. #	Tray of Ex. #	Blistering		Delamination	Adhesion	OTR
		24 hr	96 hr			
19	16	0	0	0.5%	0.37	0.014
20	18	54%	77%	2%	0.55	0.015
21	18	14%	39%	0	0.64	0.015
22	18	26%	59%	0	0.58	0.013

As can be seen in Table I of GUSAVAGE et al, reproduced immediately above, while the level of adhesion between film and foam was greater in comparative examples 20-22, the level of blistering was also greater, which would seem to be contrary to expected results. More particularly, each of the film/foam composites of Examples 20-22 of GUSAVAGE et al were designated as comparative because each was made from the film of Example 14, which contained EMA in the bonding layer. Adhesion levels of 0.55, 0.64, and 0.58 are disclosed for Example Nos. 20, 21, and 22, respectively. Blistering was present at levels of 54%, 14% and 26% at 24 hours, and at 77%, 39%, and 59% at 96 hours. In contrast, while the adhesion between film and foam was only 0.37 for working Example 19 (i.e., which used the film of Example 1, which contained styrene-butadiene copolymer in the bonding layer), it exhibited lower blistering (0% at 24 hrs and 0% at 96 hours) than was exhibited by any of Comparative Examples 20, 21, and 22. These results are apparent from a review of the data in Table I, above. Thus, the data in Table I of



GUSAVAGE et al demonstrates that bonding strength is not always directly related to blister prevention. As such, Applicants contend that blister prevention is unpredictable and that their invention of using “modified styrene-based polymer having polar groups thereon” is not predictable from GUSAVAGE et al. Applicants further contend that blister prevention is not predictable from WIRTH or BEUZELIN, either.

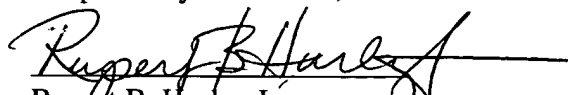
As to the recycling the composite material into the foam, Applicants contend that the disclosure in their specification supports the patentability of Claims 8, 10, 11, 12, 13, and 14, each of which recite recycling at least some of the substrate/film composite into the substrate. The ability to recycle the substrate/film composite into the substrate and obtain miscibility, foaming, and bonding, is unpredictable, as it too is based on chemical interactions between components in the blend, as well as between layers of the composite.

In summary, Applicants contend that their specification contains evidence of unexpected results that rebut any prima facie case of obviousness that may have been made out in the 25 July Office Action. On this additional basis, Applicants respectfully request that the 35 USC 103 rejection of Claims 6, 8, 10-14, and 16-22 be withdrawn.

#### **IV. Conclusion**

Applicants respectfully request reconsideration of the patentability of Claims 6, 8, 10-14, and 16-22, with a view towards allowance.

Respectfully Submitted,



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